WE CLAIM:

1. A communications channel detector for determining the availability of a desired type of communications channel in a communication system having at least one communications channel, the communications channels including data streams comprising a plurality of data symbols, the channel detector comprising:

a phase identifier configured to provide a plurality '*n*' of phase measurements for each of a plurality of consecutive ones of the data symbols comprising one of the communications channels, the *n* phase measurements for any one of the data symbols respectively corresponding to *n* timing offsets from a centre of the data symbol;

a phase comparator coupled to the phase identifier and configured to determine the differences between the phase measurements for consecutive data symbols, each of the differences corresponding to one of the *n* timing offsets and determined between phase measurements corresponding to the one of the *n* timing offsets, to provide a plurality of phase differences for each timing offset; and

a phase correlator coupled to the phase comparator and configured to determine whether or not the plurality of phase differences for at least one of the timing offsets exhibit a predetermined phase difference profile.

2. The channel detector according to claim 1, wherein:

the predetermined phase difference profile comprises a histogram of expected phase differences for the desired type of communications channel;

the phase comparator is configured to form a histogram of the plurality of phase differences for each timing offset, to provide *n* histograms; and

the phase correlator is configured to correlate each of the *n* histograms with the predetermined histogram.

3. The channel detector according to claim 1, wherein the phase identifier is configured to obtain *n* phase measurements for a first of at least two of the consecutive data symbols, and to obtain *n* second phase measurements for a second of the at least two consecutive data symbols, each said second phase measurement being associated with a respective one of the first phase measurements and being spaced apart in time from the associated first phase measurement by the symbol period.

4. The channel detector according to claim 1, wherein the phase identifier is configured to measure the phase of each data symbol at each of the *n* timing offsets to provide the *n* phase measurements.

5. The channel detector according to claim 1, wherein the phase identifier is configured to measure the phase of each data symbol at a number '*m*' of the *n* timing offsets, and to estimate the phase of each data symbol at *n-m* of the *n* timing offsets, to thereby provide *m* measured phase measurements and *n-m* estimated phase measurements as the *n* phase measurements.

6. The channel detector according to claim 5, wherein the phase identifier is configured to estimate one or more of the *n-m* estimated phase measurements using the *m* measured phase measurements and an interpolation algorithm.

7. The channel detector according to claim 5, wherein the phase identifier is configured to estimate one or more of the *n-m* estimated phase measurements using the *m* measured phase measurements and an extrapolation algorithm.

8. The channel detector according to claim 2, wherein the phase correlator is configured to correlate the *n* formed histograms by analyzing each of the *n* histograms with a sliding window function.

9. The channel detector according to claim 8, wherein the phase correlator is further configured to calculate a metric for each of the *n* histograms using the sliding window function and to correlate each of the *n* histograms by comparing its corresponding metric with a threshold.

10. The channel detector of claim 9, wherein the metric for each of the *n* histograms is calculated by computing the inner product of the predetermined phase difference profile and the histogram for each of a plurality of relative positions of the predetermined phase difference profile and the histogram, dividing each inner product by the number of phase differences used to form the histogram, and selecting the maximum of the resultant divided

inner products as the metric for the histogram.

11. The channel detector according to claim 1, further comprising a synchronization signal detector coupled to the phase correlator and configured to detect a synchronization signal on the selected communications channel when the phase correlator determines that the plurality of phase differences for at least one of the timing offsets exhibit the predetermined phase difference profile.

12. The channel detector according to claim 1, wherein the desired type of communications channel is a Gaussian Minimum Shift Keying (GMSK) communications channel.

13. The channel detector according to claim 1, further comprising a memory configured to store a channel list, the channel list including each of the at least one communications channel.

14. The channel detector according to claim 1, wherein $n \geq 8$.

15. The channel detector according to claim 1, wherein $n \leq 16$.

16. The channel detector according to claim 1, implemented in a wireless communication device.

17. The channel detector according to claim 15, wherein the wireless communication device is a device selected from the group consisting of a mobile communication device, a mobile telephone, a wireless modem, a pager, and a personal digital assistant (PDA).

18. In a communication system having at least one communications channel, each communications channel including data streams comprising a plurality of data symbols defining symbol periods, a method for determining the availability of a desired type of communications channel, comprising the steps of:

for each of the at least one communications channel,

obtaining a plurality '*n*' of phase measurements for each of a plurality of consecutive ones of the data symbols comprising the communications channel;

for each pair of consecutive data symbols of the plurality of consecutive data symbols, determining *n* phase differences between ones of the obtained phase measurements separated in time by a symbol period, to provide *n* sets of phase differences between phase measurements for consecutive symbols; and

determining whether or not at least one of the *n* sets of phase differences exhibits a predetermined phase difference profile.

19. The method according to claim 18, wherein the *n* phase measurements, the *n* phase differences and the *n* sets of phase differences respectively correspond to *n* timing offsets from a centre of each of the data symbols.

20. The method according to claim 19, wherein:

the predetermined phase difference profile comprises a histogram of expected phase differences for the desired type of communications channel;

the step of determining *n* phase differences comprises forming a histogram of the phase differences of each of the *n* sets of phase differences, to provide *n* histograms; and

the step of determining whether or not at least one of the *n* sets of phase differences exhibits a predetermined phase difference profile comprises correlating each of the *n* histograms with the predetermined histogram.

21. The method according to claim 19, wherein the step of obtaining a plurality of phase measurements comprises the step of measuring the phase of each data symbol at each of the *n* timing offsets.

22. The method according to claim 19, wherein the step of obtaining a plurality of phase measurements comprises the steps of:

measuring the phase of each data symbol at each of *m* of the *n* timing offsets; and

estimating the phase of each data symbol at each of the remaining *n-m* of the *n* timing offsets.

23. The method according to claim 20, wherein the step of correlating comprises generating a metric by analyzing the *n* formed histograms with a sliding window function.

24. The method according to claim 23, wherein the step of determining whether or not at least one of the *n* sets of phase differences exhibits a predetermined phase difference profile comprises comparing the metric with a threshold.

25. The method according to claim 24, wherein the step of generating a metric comprises the steps of generating *n* metrics by analyzing each of the *n* histograms with the sliding window function and selecting a highest of the *n* metrics to be used in the step of comparing.

26. The method according to claim 18, wherein the data symbols carried on the desired type of communications channel are modulated in accordance with a Gaussian Minimum Shift Keying (GMSK) modulation scheme.

27. The method according to claim 18, further comprising the step of detecting a synchronization signal on the communications channel when it is determined that at least one of the *n* sets of phase differences exhibits the predetermined phase difference profile.

28. A communications channel detector for determining the availability of a desired type of communications channel in a communication system having at least one communications channel, the communications channels including data streams comprising a plurality of data symbols, the channel detector comprising:

phase identifier means for providing a plurality '*n*' of phase measurements for each of a plurality of consecutive ones of the data symbols comprising a selected one of the

communications channels, the *n* phase measurements for any one of the data symbols respectively corresponding to *n* timing offsets from a centre of the data symbol;

phase comparator means coupled to the phase identifier means for determining the differences between the phase measurements for consecutive data symbols, each of the differences corresponding to one of the *n* timing offsets and determined between phase measurements corresponding to the one of the *n* timing offsets, to provide a plurality of phase differences for each timing offset; and

phase correlator means coupled to the phase comparator means for determining whether or not the plurality of phase differences for at least one of the timing offsets exhibit a predetermined phase difference profile from a correlation of the plurality of phase differences with the predetermined phase difference profile.

29. A wireless communication device comprising:

a transceiver configured to transmit and receive signals over a desired type of communications channel; and

a digital signal processor (DSP) operatively connected to the transceiver, the DSP comprising computer software code for determining the availability of the desired type of communications channel in a communication system having at least one communications channel, the communications channels including data streams comprising a plurality of data symbols, by performing the functions of:

for each of the at least one communications channels,

obtaining a plurality '*n*' of phase measurements for each of a plurality of consecutive ones of the data symbols comprising the communications channel;

for each pair of consecutive data symbols of the plurality of consecutive data symbols, determining *n* phase differences between ones of the obtained phase measurements separated in time by a symbol period, to provide *n* sets of phase differences between phase measurements for consecutive symbols; and

determining whether or not at lease one of the *n* sets of phase differences exhibits a predetermined phase difference profile.

30. The wireless communication device according to claim 29, wherein the device is selected from the group consisting of a mobile communication device, a mobile telephone, a wireless modem, a pager, and a personal digital assistant (PDA).

31. A computer-readable medium carrying processing instructions for configuring a computational device with a method for determining the availability of a desired type of communications channel in a communication system having at least one communications channel, the communications channels including data streams comprising a plurality of data symbols, the method comprising the steps of:

for each of the at least one communications channel,

obtaining a plurality '*n*' of phase measurements for each of a plurality of consecutive ones of the data symbols comprising the communications channel;

for each pair of consecutive data symbols of the plurality of consecutive data symbols, determining *n* phase differences between ones of the obtained phase measurements separated in time by a symbol period, to provide *n* sets of phase

differences between phase measurements for consecutive symbols; and

determining whether or not at lease one of the *n* sets of phase differences exhibits a predetermined phase difference profile.